EXTENSION SERVICE
U. S. Dept. Agr.

VEGETABLE SEED TREATMENT TESTS, 1942*

During 1942 cooperative vegetable seed treatment tests started in 1940 were continued. Thirty-nine investigators in 30 States and two provinces of Canada cooperated with the committee appointed by the American Phytopathological Society to coordinate research on vegetable seed treatments. Uniformly treated lots of seed were used by cooperators in various States.

Results from these tests could serve as a basis for standardized national recommendations if it seemed necessary. However, the committee feels that nation-wide standardization at the present time is not imperative. Final recommendation for treatments in any State must be determined by the qualified investigators who are acquainted with local conditions in the State. The reports from the 39 co-operators in 1942 show the following facts.

Peas.-Reports on 29 tests showed a significant increase in emergence of the early variety Surprise in 69 percent of the localities and of the variety Alderman in 83 percent. Spergon (2 oz. per bushel) and Semesan (2.5 oz.) produced better emergence than Yellow Cuprocide (1.5 oz.) or Red Cuprocide (2.5 oz.). The average of all tests shows emergence of Surprise was increased from 70 percent when untreated to 85.4 percent when treated with Semesan, and that emergence of Alderman was increased from 70.3 to 88.4 percent by Semesan and Spergon. Spergon treated seed produced a larger yield of vine and pods than other treated lots. The present recommendations, in order of their preference, would be to use Spergon at 1.5 to 2 oz. per bushel, Semesan at 2.5 oz., or Red Cuprocide at 2.5 oz.

Lima beans.-Reports on 30 tests showed a significant improvement in emergence of the variety Henderson Bush in 37 percent of the localities and of Fordhook in 47 percent. Spergon, at 2 oz. per bushel, was slightly more effective than Arasan, at 1.2 oz., on both varieties. Emergence in Fordhook was increased on the average from 55.5 to 67.5 percent and in Henderson Bush from 60.8 to 69.3 percent. Apparently, either material can be used on this crop without hardening the seed coat or retarding growth; so they are recommended at the dosages used in these tests.

Spinach.-Reports on 34 tests with Virginia Savoy showed a significant increase in emergence in 62 percent of the localities. The average emergence from untreated seed was 43.6 percent as compared to 64.9 for the best treatment (zinc hydroxide). Vasco 4 and one sample of zinc hydroxide were superior to Cuprocide, but three zinc oxides and one sample of zinc hydroxide were inferior. All these materials, used at the rate of 2 percent by weight, were superior to Spergon, at 1 percent. Apparently, zinc hydroxide, or cuprous oxide, or zinc oxide can be used. The 1941 tests showed a 2 percent dosage was preferable to 1 percent.

Sweet corn.-Reports on 29 tests with Golden Cross Bantam showed a significant improvement in emergence in 28 percent of the localities. Red cuprous oxide (0.25 percent) and zinc oxide (2 percent) reduced emergence in some tests, but Semesan Jr. did not cause injury. In the past 2 years, Semesan Jr. has produced a significant improvement in emergence in only 6 out of 54 localities. It is recommended at 1.5 oz. per bushel as an inexpensive seed treatment.

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*From Subcommittee on Vegetable Seed Treatments, Seed Treatment Committee, American Phytopathological Society. George L. McNew, Chairman.

Lettuce.-There was a significant improvement in emergence from treatment in 33.3 percent of the 30 tests made in 1942. Similar results were obtained in 1941. Semesan, at 0.2 percent by weight, red copper oxide, at 2 percent, and zinc oxide, at 2 percent, were about equally satisfactory in both years.

Tomato.-The tolerance of seed to hot-water disinfection was measured for 16 different varieties in 38 tests. The critical temperature for seed injury (after exposure to 20°, 50°, 52°, 54°, 56°, 58°, or 60° C. for 30 minutes) varied with the stock. In general, seeds 90 to 100 percent viable were injured enough to give significantly less emergence at temperatures above 54°; those 80 to 90 percent viable, at 52°; and less viable seed (below 50 percent viable) were injured at 50°. Apparently, most stocks of all varieties can be safely treated at 52 to 54° C. This is adequate for eliminating most seed-borne pathogens.

Irish potatoes.-The 14 tests on potato-seed disinfection by five treatments -- (1) 90 minute soak in $HgCl_2$, (2) dip in yellow oxide of mercury, (3) 5-minute dip in acidulated (HCl) $HgCl_2$, (4) 5-minute dip in acidulated (acetic acid) $HgCl_2$, and (5) 1-minute dip in New Improved Semesan Bel) - failed to increase emergence significantly. The value of treating ordinary table stock is open to question because balanced against some control of Rhizoctonia and increased yields in two tests, was a delay in emergence and reduction in yield in several tests. Better, less toxic treatments seem to be needed.

Beets.-Tests made in 1941 showed that Red Cuprocide, used at the rate of 1.5 percent by weight, gave better results than either a 3 or 6 percent dosage. Semesan gave comparable results when the dosage was increased to 2.5 percent, but zinc oxide was not so consistently beneficial. The entire situation with this crop has changed during the past 2 years and a new series of tests will be made in 1943 to evaluate the new organic sulfur compounds, Yellow Cuprocide and Ceresan.

Cucurbits.-Tests with cucumbers of the variety Chicago Pickling in 1941 showed that both Cuprocide, at 0.2 percent, and Semesan at 0.25 percent, were effective seed protectants. Emergence was significantly improved in 11 of 26 tests.

Cabbage.-Tests in 1941 showed that hot-water treatment (122° F. for 25 minutes) injured seed of the variety Marion Market slightly, but that seed protectants improved emergence appreciably in 17 of 24 tests. Semesan, at 0.42 percent, was slightly more effective than zinc oxide, at 2 percent.

Plans for 1943

This program for vegetable seed treatments will be expanded in 1943. Emphasis will be placed upon substitute and new seed protectants and upon minimum effective dosages. All plant pathologists have a dual function in studying seed treatments. It is their privilege to help growers meet their production quotas with a minimum loss of labor, seed, and fertilizer. At the same time, they want to do everything possible to conserve strategic materials, such as copper, mercury, and zinc.

Seed treatments are cheap in proportion to their benefits, so we should insist on the use of all that is necessary, but we should avoid wastage. For example, the recommended treatment for cannery peas costs less than 70 cents an

acre, and the benefits have actually averaged $15 to $30 an acre in New York fields. There would be no economy in lowering the dosage rate even a third if 3 percent of the benefits were lost. However, dollars and cents are not the final criterion of the value of such things when human labor is the primary critical shortage.